Integrated Breast Diseases Research and Cancer Registry in Turkey

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A system we call BDRS is implemented as an integrated disease specific system for breast diseases in order to obtain and use patient health data for clinical research, cancer registry and clinical care. It is an open, flexible and modular system that supports multi-institutional and multi-viewed utilization of health data. Three-tier web based architecture, and object oriented technologies have been employed to ensure its extendibility. Exchange and sharing of health data have been implemented with XML.

Problem Definition & System Description

Obtaining accurate, complete, and timely health data is essential for health care reporting, as well as clinical and epidemiological research. Given the frequency of breast diseases we have decided to establish a system for this disease group [1]. Breast Diseases Research and Breast Cancer Registry System (BDRS) is the first system developed in Turkey for cancer registry and breast diseases research.

The main objective of the system is to construct a national breast diseases research system integrated with patient follow up and to establish a core for national breast cancer registry system. BDRS accumulates disease specific health data into standardized and sharable repositories at inter-institutional, national and international level. It is a multi-institutional and multi-viewed research and patient care system [2].

BDRS system covers two main requirements; generating health information for clinical research; and cancer registry; and providing electronic patient record and follow-up for clinical care. By compiling two functions in one system, we aimed to reduce the exploitation of financial and human resources, increase quality of information by increasing accuracy, timeliness and completeness of the data.

Structure of BDRS is composed of two main components: "Clinical Care and Research for Breast Diseases" and "Registry System for Breast Cancer". Clinical Care includes a sharable EPR with a patient follow-up system. A risk assessment function is integrated to the core business activity. Different institutions can share Clinical Care component of BDRS. Health data aggregated via seamless follow-up is utilized for clinical research. Registry System generates its data from Clinical Care component.

Technology & System Architecture

BDRS takes advantage of three main technologies, namely web-based three tier architecture with middleware, object oriented methodologies and programming, and XML data exchange standard. Middleware is a key technology that ensures openness, flexibility and modularity of the BDRS [3]. At the back end, for database management MS SQL server is used. Integrated and consistent health data are stored and retrieved by this data service layer. At the middle, Tomcat and Apache servers are used as the application servers. Application layer is the business logic layer that encapsulates all functions and procedures. On the front site, Apache web server runs. Web layer contains java server pages, html files, and static content. BDRS has thin client architecture and clients connect to it via standard web browser.

Integration of clinical and research data has been a major design objective for BDRS. Present system is designed to support different user profiles for executing various functions. BDRS is a highly structured, and standard based implementation. It is coded with ICD-O 3 and ICD-9 used with SNOMED. Data exchange is implemented with XML standard. BDRS can interface with any type of system, and data can be extracted according to DTD document.

Conclusion

BDRS is a multi-view system that provides seamless patient care and life time follow-up, and supplies up-to-date and complete research data. We employed web based three-tier architecture, XML standards, and object oriented technologies to design an open, flexible, modular, and extendible system. Health data can be shared and exchanged between institutions, and accurate, complete, timely disease data obtained both for researchers and clinical care providers.

References

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